IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of	)	
Frank T. Check et al	)	Group Art Unit: 216
Serial No.: 472,559	)	Attorney Docket: B-812
Filed: March 7, 1983	)	September 20, 1984
For: APPARATUS AND METHOD FOR CORRECTING IMPERFECTION IN A POLYGON USED FOR LASER SCANNING	)	

APPELLANTS BRIEF

Honorable Commissioner of Patents and Trademarks

Washington, D.C. 20231

426-43

S I R:

This is an appeal from the Office Action of April 13, 1984 wherein claims 1, 3, 5, 6, 8, 11-14, 16, 18, 20 and 21 of the above-entitled application were finally rejected. The claims on appeal read as follows:

1. Apparatus for printing characters on a record medium in accordance with input data, comprising:

an electronic printer having means for producing dot matrix patterns on a record medium,

a microprocessor connected to said electronic printer,

a data input connected to said microprocessor, and

a look-up table connected to said microprocessor that contains information of the characters to be printed on the record member by said printer in the form of different dot sizes, whereby characters with smoothed edges may be produced by said electronic printer.

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3. The apparatus of claim 1 wherein said electronic printer is a jet ink printer.

5. The apparatus of claim 1 wherein said electronic printer is a dot matrix printer.

6. Method of printing text characters on a record medium in accordance with input data, comprising:

supplying an electronic printer having means for providing dot matrix patterns on a record medium,

connecting a microprocessor to the electronic printer,

connecting a data input to the microprocessor, and

connecting to the microprocessor a look-up table containing information of various size dots required to produce characters with smooth edges, and creating a character with different dot sizes on the record medium.

8. A method of dot matrix printing for printing characters on a record medium, comprising:

supplying information relative to the characters to be printed,

determining the dot sizes that would result in characters having smooth edges, and

generating a dot matrix in accordance with the determination and information supplied.

11. Apparatus for printing, comprising:

means for producing dots on a record medium,

means for controlling the location of said dots on said record medium to produce characters,

means for supplying information of the characters to be printed to said producing means, and

means for controlling the dot sizes so as to produce characters with smooth edges.

12. The apparatus in claim 6 wherein said means for producing dots comprises means for creating ink dots of a sheet of paper.

13. A method of printing, this step comprising:

producing dots on a record medium,

controlling the location of said dots on said record medium to produce characters,

supplying information of the characters to be printed to said producing means, and

controlling the dot sizes so as to produce characters with smooth edges.

14. The method of claim 8 wherein said step for producing dots comprises means for producing ink dots on a sheet of paper.

16. Apparatus for printing characters on a record medium in accordance with input data, comprising:

an electronic printer having means for producing dot matrix patterns on a record medium,

a microprocessor connected to said electronic printer,

a data input connected to said microprocessor, and

a look-up table connected to said microprocessor that contains maps of the characters to be printed on the record member by said printer wherein a character representation is composed of a plurality of maps having different dot sizes with dots of a single size on each map whereby maps for a given character when combined form a character with smoothed edges.

18. The apparatus of claim 16 wherein said electronic printer is a jet ink printer.

20. The apparatus of claim 16 wherein said electronic printer is a dot matrix printer.

21. Method of printing text characters on a record medium in accordance with input data, comprising:

supplying an electronic printer having means for providing dot matrix patterns on a record medium,

connecting a microprocessor to the electronic printer,

connecting a data input to the microprocessor, and

connecting a look-up table containing maps of the characters to be printed to the microprocessor, creating a character by using a plurality of maps with dots of a different size on each map to form characters with smoothed edges.

THE REFERENCES CITED

U.S. Patent No. 3,471,847 - McCollough et al

U.S. Patent No. 4,050,077 - Yamada et al

U.S. Patent No. 4,052,719 - Hutt et al

U.S. Patent No. 4,281,333 - Tsuzuki et al

U.S. Patent No. 3,884,148 - Bergeron

BACKGROUND OF THE INVENTION

This invention resides generally in the printing art and more specifically in the electronic dot matrix printing field. In dot matrix printers, combinations of dots are created on a record medium so that one may obtain printed characters for fashioning an original text. Dot matrix printers create characters by printing dots in a predetermined pattern. These printers are relatively inexpensive and have high speed; however, these advantages are achieved at the expense of print quality. The individual dots would be discernable and the characters appear with either breaks in the character or ragged edges. The technique of overlapping dots has been used in an effort to improve print quality, but any advantage of this technique is useful only with regard to straight edges which are generally vertical or horizontal.

THE REFERENCES APPLIED

Yamada et al, U.S. Patent No. 4,050,077 - Yamada et al disclosed ink jet printers wherein the pressure and voltage which are used to produce ink droplets are controlled so that either large or small dots may be produced. In this way, Yamada et al are able to produce different size characters by using either small dots for small sized characters or large

dots for large sized characters or alternating between the two size dots for some characters of an intermediate size to obtain better quality printing.

Tsuzuki et al, U.S. Patent No. 4,281,333 - This reference shows an ink jet printer of the pulse-on-demand type wherein the charging voltage is varied so as to be proportional to the weight M of the ink droplet being printed. The driving pulse P_d determines the size of the ink droplet and the charging voltage V_c is varied and proportional to the energy of the driving pulse. Tsuzuki et al state that the droplet size is varied in response to the picture signal level L that is received from a picture signal. The purpose of the Tsuzuki et al invention is to obtain constant velocity for the ink jets regardless of the size of droplets.

THE INSTANT INVENTION

The Applicants have discovered a dot matrix printing technique that retains the advantages of dot printing while achieving print quality comparable to that of impact printing. This is achieved by intermeshing dots of different sizes with a predetermined distribution, particularly along the edges of the characters. With this technique, smooth edges can be achieved for an edge, be it straight, at an angle, curvilinear or irregular. By obtaining characters with smooth edges, the quality of the characters printed is improved.

THE REJECTION

The Examiner has rejected claims 1, 3, 5, 6, 8, 11-14, 16, 18, 20 and 21, all the claims of the pending application,

under 35 USC 102 (e) as being anticipated by Yamada et al or Tsuzuki et al.

DISCUSSION

In his rejection, the Examiner rejects the claims alternately under 35 USC 102 (e) as being anticipated by either by Tsuzuki et al or by Yamada et al.

All the claims under consideration have the requirement that the printer produce dots of different sizes such that characters with smooth edges may be created. As is brought out in the specification, this is achieved by intermeshing the dot sizes such that a smoother appearance is obtained on the edges of the characters being printed. This smoother edge results in higher quality printed characters. Neither Tsuzuki et al nor Yamada et al discloses a similar type of concept nor they do they disclose a method that would result in the Applicants' invention.

Tsuzuki et al receive an incoming signal in terms of a picture element and derive an analog picture signal level L that determines the voltage for emitting an ink droplet. As a consequence, they will have a multitude of different size dots depending upon the picture element that is being scanned and digitized. Obviously, the mass of the dot will be proportional to its size, and as a consequence, in order to have uniform volocity for all of the dots, the driving pulse must be varied in proportion to the charging voltage.

It will be noted that Tsuzuki et al acknowledge that variable dot sizes have been used in the past, and they go on to state that one of their objectives is to have an ink jet

printer of the pulse-on-demand type capable of contributing to the reproduction of finer letters and patterns. Their contribution for obtaining finer letters and patterns is not concerned with use or selection of variable dot size but rather obtaining constant velocity for the drops regardless of their weight. This is their invention. There is no teaching in Tsuzuki et al or any suggestion that one may be able to vary the dot sizes for the purpose of obtaining characters with smoother edges. In order to obtain smooth edges, one must have an intermeshing of the various dot sizes. There is no teaching in Tsuzuki et al of a geometrical relationship of the dots. In the claims of the Applicants, apparatus and methods are defined that requires each character to be processed individually to create the dot pattern for obtaining smooth edges. Tsuzuki et al are concerned with the faithful reproduction of picture elements one by one, i.e., an analog signal that determines the size of each dot to be printed. As a consequence, they do not teach the concept of creating characters with smooth edges.

Claims 1, 6, 16 and 21, as well as those claims dependent upon these independent claims, include the element of a look-up table. This look-up table serves the purpose of providing information on the characters to be printed in the form of different dot sizes whereby characters with smooth edges may be produced. Tsuzuki et al do not include a look-up table that serves this function. Although they have a look-up table, the look-up table is not concerned with the formation of characters. Their look-up table is concerned with how much voltage is required to produce a driving force for emitting an ink droplet. As a consequence, it cannot be said that Tsuzuki et al anticipate these claims.

Claims 16 and 21, and those claims dependent thereon, include a plurality of maps, or use a look-up table containing maps, respectively. Each of the maps contains dots of a given size with each map containing a different size dot from the other maps. No such structure or concept is found in Tsuzuki et al.

In his final rejection, the Examiner quotes column 1, lines 50-53 of Tsuzuki et al where his object is stated to contribute "to reproduction of finer letters and patterns". The Examiner uses this broad language to support his contention that Tsuzuki et al anticipates the Applicant's basic concept of varying the dot sizes for the purpose of creating characters with smooth edges.

It should be noted that Tsuzuki et al can only recreate. They teach obtaining better fidelity in that which is being reproduced. They cannot modify, create nor generate characters to achieve a goal, in our case smooth edges.

It is submitted that Tsuzuki et al do not teach or contemplate intermeshing of dot sizes for producing characters with smooth edges nor do they suggest the same. Tsuzuki et al obtain uniform distribution of dots, and, because of this, their print quality is better than the prior art. It is not because of the different dot sizes that they obtained better quality, but because of velocity uniformity. The Examiner states that Tsuzuki et al use a combination of varying dot sizes and velocity control to obtain finer letters. Obviously, velocity control results in uniform distribution of dots or more specifically, alignment of dots. Tsuzuki et al accept whatever information is supplied. They

do this on a pixel-by-pixel basis and whatever information is transmitted to their system is what will be reproduced. Their system does not vary the dot size as is alleged by the Examiner. They simply reproduce that which is received. As a consequence, it cannot be said that they have a system that varys the dot size for the purpose of creating characters with smooth edges. As stated, the Examiner basis his conclusion upon the language in Tsuzuki et al where they state "to reproduction of finer letters and patterns". There are many ways to reproduce finer letters and patterns, one of which is obtaining uniform distribution of the dots as is taught by Tsuzuki et al. Other parameters that can be controlled are droplet size uniformity, ink absorption by the medium, dot configuration, etc. Because Tsuzuki et al state they are going to attempt to reproduce finer letters and patterns, it doesn't necessarily follow that they are disclosing the Applicant's invention. Consequently, it cannot be said Tsuzuki et al anticipate Applicants' claims 1, 3, 5, 6, 8, 11-14, 16, 18, 20 and 21.

Yamada et al are concerned with the relationship between the size of characters that can be printed and dot sizes. They teach printing thin and thick characters, but they are not concerned with obtaining characters having smooth edges. Furthermore, there is no random selection of their dots. They are only able to produce large dots individually, small dots individually, or are able to alternate between large and small dots. They have no ability in their continuous droplet type ink jet printer for obtaining characters with smooth edges because they are unable to intermesh different size dots at will. Furthermore,

each of their strokes is a line of constant width. Figs. 8, 11 and 13 demonstrate that each of their strokes represents a character line. There is no varying of the dot sizes within a line for the purpose of obtaining smooth edges. Furthermore, they are limited because once they elect to print a large dot, they cannot print a small dot unless they alternate or skip a pitch. They cannot substitute a large dot for a small dot or vis-versa in a single line of a character.

The Examiner points to Fig. 13 of Yamada et al alleging that the top of the figure "1" shows an intermixed relationship of large and small dots. The Examiner has selected an isolated area where a large dot is interposed between two smaller dots as a result of the intersection of two lines and states Yamada et al show intermixing. Although Fig. 13 is not explained in detail in the specification of Yamada et al, reference can be had to Fig. 11 and the descriptive portion therefor in the specification for a complete understanding thereof. Fig. 13 serves to prove the Applicant's argument that Yamada et al cannot produce characters having smooth edges. Reference is made to attached Exhibit "A" which is a highlighted reproduction of Fig. 13. In the portion of Fig. 13 labeled (a) the levels 1-7 on the left indicate where the large dots are to be produced (highlighted in red) and the levels 1 - 12, 14 and 15 indicate where the small dots are to be produced (highlighted in green). It will be noted that at the first level for the small dots, four small dots are printed. One large dot is printed at each of the large dot levels 1 - 6

and no large dot is produced at level 7. Two small dots are produced at level 10 and so forth. The record member appears to be traveling in the X direction and the ink jet is enabled sequentially in the Y direction. As a consequence, as a sheet of paper is moved in the X direction, the ink jet will be activated sequentially starting at level 1. As can be seen from reference to lines (c) and (d), first the ink jet will produce small dots, then large dots in accordance with the scheme of Fig. 5. The large dots and small dots are printed alternatively. It will be noted there is no intermeshing of dot sizes by Yamada et al for the purpose of obtaining smooth edges. It will be noted that at a specific location, they can print either a small dot but not a large dot or a large dot but not a small dot. As can be seem from lines (c) and (d) there is no alternative selection. Obtaining smooth edges requires smoothing all edges either vertical, horizontal, curvilinear or irregular. Yamada et al are unable to do this due to restriction in dot location. Consequently, there is no ability to intermesh different size dots to produce smooth edges on a character and it cannot be stated that Yamada et al anticipate the Applicant's invention.

Referring again to Fig. 13, all large dots are printed on the stem and all small dots at the top and base of the number 1. This demonstrates that Yamada et al produce either all large dots for a given portion of their characters or all small dots. There is no intermeshing of dot sizes to obtain better print quality. They either print a stroke with all small dots, as seen at the top of Fig. 13 or they print a stroke of all large dots, as seen in the stem of the number

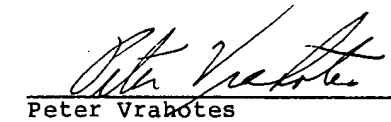
1. It should be noted that portion of the numeral "1" in Fig. 13 to which the Examiner refers has no intermixing of dots at the edge. The upper edge of the numeral has all small dots.

Because of the reasons brought forth above, it is submitted claims 1, 3, 5, 6, 8, 11-14, 16, 18, 20 and 21 are not anticipated by Yamada et al.

As was stated in Kalman v. Kimberly - Clark Corp. 218 USPQ 781, 789 (CAFC, 1983), "a party asserting that a ... claim is anticipated under 35 USC 102 must demonstrate, among other things, identity of invention". The court also quotes with favor the holding of Illinois Tool Works, Inc. v. Sweetheart Plastics, 436 F 2nd 1180, 1182-83, 168 USPQ 451, 453-454 1971. "To be an anticipation a prior patent must include all the teachings necessary to accomplish what the allegedly invalid patent succeeds in doing." It is submitted that neither Tsuzuki et al nor Yamada et al satisfy these two requirements.

In view of the above comments, it is respectfully requested that the Board of Examiners overrule the final rejection of the Examiner and allow claims 1, 3, 5, 6, 8, 11-14, 16, 18, 20 and 21.

Respectfully submitted,



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